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# **Macro Models: un APP for Macroeconomic Models. User Manual 1.0**

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MACRO MODELS  
UN APP FOR MACROECONOMIC MODELS  
User Manual

Version 1.0  
Very Preliminary Version

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# The Income-Expenditure Model

## 1. Introduction

This paper is simply a user manual of an APP that simulates the widely used Macroeconomic Models.

## 2. Income Expenditure Model

### 1. Legenda

#### Input

$\bar{C}$	Autonomous (exogenous) Consumption
$I_0$	Net Investment
NX	Net Export
C	Marginal propensity to consume

G	Government Spending
TR	Net Government Transfers
t	Income tax rate

#### Output

NMP	Net Marginal Propensity to consume
Multiplier	Keynesian Multiplier
Eq. Income	Equilibrium Income
Eq. Consumption	Equilibrium Consumption
Balance	Government Surplus
$\Delta$ Income	Income Variation

#### Graph

EAD	Autonomous Aggregate Demand
Y	Income
tY	income tax
C	Consumption
I	Investment
D	Government Surplus
B	Government Debt

## a. The Model

$Y$  is the Income. The Aggregate Demand is given by

$$[1.] \quad AD = G + NX + I + C$$

Where

$$[2.] \quad G = \bar{G}$$

$$[3.] \quad NX = \overline{NX}$$

$$[4.] \quad I = I_0$$

The direct Tax Revenue is equal to

$$[5.] \quad TA = tY$$

where  $t$  is the income tax rate

TR is the Government Transfers

$$[6.] \quad TR = \overline{TR}$$

The Disposable Income is defined as

$$[7.] \quad YD = Y + TR - TA$$

$$[8.] \quad YD = Y + TR - tY$$

$$[9.] \quad YD = (1 - t)Y + TR$$

The consumption function depends on Disposable Income (YD)

$$[10.] \quad C = \bar{C} + cYD$$

$$[11.] \quad C = \bar{C} + c((1 - t)Y + TR)$$

$$[12.] \quad AD = C + I + NX + G + TR$$

$$[13.] \quad AD = \bar{C} + c((1 - t)Y + TR) + I_0 + G + NX$$

$$[14.] \quad AD = \bar{C} + c((1 - t)Y_t + TR) + I_0 + G + NX$$

$$[15.] \quad AD = \bar{C} + cTR + I_0 + G + NX + c(1 - t)Y$$

In Equilibrium: Supply( $Y$ )= Demand ( $AD$ )

$$[16.] \quad Y = AD$$

### a. Results

Equilibrium Income

$$[17.] \quad Y_E = \frac{1}{1-c(1-t)} (\bar{C} + cTR + I_0 + G + NX)$$

$$[18.] \quad \overline{AD} = \bar{C} + cTR + G + NX + I_0$$

### Multipliers

Expenditure's multiplier

$$[19.] \quad \frac{dY}{d\bar{C}} = \frac{dY}{dI_0} = \frac{dY}{dNX} = \frac{dY}{dG} = \frac{1}{1-c(1-t)}$$

Transfer's multiplier

$$[20.] \quad \frac{dY}{dTR} = \frac{c}{1-c(1-t)}$$

Tax multiplier

$$[21.] \quad \frac{dY}{dt} = \frac{-c}{(1-c(1-t))^2}$$

Balance Surplus (BS) is equal to

$$[22.] \quad BS = TA - G - TR$$

$$[23.] \quad BS = tY - G - TR$$

$$[24.] \quad BS = t \frac{1}{1-c(1-t)} (G + cTR + I_0 + NX + C) - G - TR$$

## 3. References

Blanchard O. (2009), Macroeconomics 5<sup>th</sup> Edition Pearson Education Inc

Branson W. H. (1989), Macroeconomic Theory and Policy, 3<sup>rd</sup> Edition , Harper & Row, New York

Dornbusch R., Fisher S., Startz R. (2008), Macroeconomics, 10<sup>th</sup> Edition The Mc-Graw-Hill Companies, srl

Samuelson P. (1939) Interaction between the Multiplier Analysis and the Principle of Acceleration The Review of Economic and Statistics, Vol 21. No. 2 pp 75-78

#### 4. APPENDIX

Results Table 1.1

Net Marginal Propensity	$c(1 - t)$
Multiplier	$\frac{1}{1 - c(1 - t)}$
Equilibrium Income	$Y_E = \frac{1}{1 - c(1 - t)} (\bar{C} + cTR + I_0 + G + NX)$
Consumption	$\bar{C} + c((1 - t)Y_E + TR)$
Balance Surplus	$BS = tY_E - G - TR$